

REMARKS

The Examiner's Office action mailed April 11, 2003, has been reviewed. In response thereto, the Applicants submit this Amendment and Response. Applicants have cancelled claims 24 and 72-74. Independent claim 25 has been amended to more particularly define the disclosed invention, and certain of dependent claims 57-71 have been amended to correct dependencies and provide proper antecedent basis. Claims 75 and 76 have been rewritten in independent form and dependent claims 77 and 78 have been amended to correct dependencies and provide proper antecedent basis. The amendments to the claims contained herein contain no new matter. In view of these amendments and the following arguments, Applicants respectfully submit that the application is now in condition for allowance.

Claim Rejections - 35 U.S.C. § 112

The Examiner rejected claims 60-62 under 35 U.S.C. § 112, first paragraph, suggesting the specification does not provide enablement for regulating the output of an engine in response to an engine output signal. Applicant respectfully directs the Examiner's attention to independent claim 25, lines 24-26, where there is claimed "an engine speed monitor adapted to detect an operating speed of an engine and transmit an engine output signal...." Claims 60-62 depend from claim 25 and therefore include the limitation recited as the engine speed monitor. Furthermore, the specification at page 15, lines 9-15, describes that the engine speed monitor 66 tracks the output of the engine 63, and indicates other measurements may also be used to track engine output. Applicant respectfully requests reconsideration of the § 112, first paragraph, rejection of claims 60-62.

The Examiner also rejected claims 60-62 under 35 U.S.C. § 112, second paragraph, for failing to particularly point out and distinctly claim the invention because the claims lack antecedent basis for "the engine output signal." Applicant respectfully directs the Examiner's attention to independent claim 25, lines 24-26, where there is claimed "an engine

speed monitor adapted to detect an operating speed of an engine and transmit an engine output signal....” Claims 60-62 depend from claim 25 and therefore include the limitation recited as the engine speed monitor. Applicant respectfully requests reconsideration of the § 112, second paragraph, rejection of claims 60-62.

The Examiner rejected claim 77 under 35 U.S.C. § 112, second paragraph, for failing to particularly point out and distinctly claim the invention because of confusion with regard to the phrases “predetermined flow rate” and “predetermined rate.” Claim 77 has been amended to further clarify the invention. Applicant respectfully requests reconsideration of the rejection of claim 77.

Claim Rejections - 35 U.S.C. § 102

The Examiner rejected claims 24, 72-74, 77, and 78 under 35 U.S.C. § 102(e) as being anticipated by Alft (U.S. 6,308,787). Claims 24 and 72-74 have been cancelled. Claims 77 and 78 have been amended to depend from amended claim 76. Applicant respectfully requests reconsideration of the rejections of claim 77 and 78.

Independent claim 76, as amended, is directed to a method for using a horizontal drilling machine having a plurality of automated functions and comprising a drill string to which an underground tool is attached. The method comprises axially advancing the drill string so as to move the underground tool along at least a portion of the selected path, while automatically operating at least one of the plurality of automated functions, and automatically controlling supply of fluid to the underground tool by stopping fluid flow if the drill string is being lengthened or shortened. Claim 77 further limits the method of claim 76 by automatically controlling supply of fluid by maintaining fluid flow at a predetermined rate when the drill string is being advanced, a fluid pressure is at a predetermined limit, and a measured flow rate exceeds a predetermined limit.

Alft discloses use of a horizontal drilling system having a drilling machine, drill string, a drive system, a plurality of sensors, and a central processor. Alft indicates that the drive

system may include a rotation motor and a thrust pump for advancing the drill string. Alft also suggests that the amount of fluid dispensed to the downhole tool may be modified depending on the amount of fluid and material that is expected to be removed from the borehole. Nowhere, however, does Alft describe or suggest fluid flow that is automatically controlled by stopping the fluid flow if the drill string is being lengthened or shortened. Furthermore, Alft does not suggest or disclose automatically controlling supply of fluid to the underground tool based on whether fluid pressure is at a predetermined limit, as required by amended claim 77. Thus, claim 77, as amended, is not anticipated by Alft, and the § 102(b) rejection of this claim must be withdrawn.

Claim 78 also depends from claim 76 and includes all the limitations thereof. Claim 78 further requires automatically identifying a position of the underground tool. The step of identifying a position of the tool comprises sensing a roll position of the tool, sensing a pitch of the tool, sensing an orientation of the tool, sensing the temperature of the tool, and calculating the position of the tool using the sensed roll position, pitch, orientation, and temperature information.

As discussed above, Alft discloses use of a horizontal drilling system having a drilling machine, drill string, a drive system, a plurality of sensors, and a central processor. Alft also suggests that the position of the boring tool may be computed. However, Alft does not disclose or suggest calculating the position of the tool based on roll, pitch, orientation, *and* temperature data, as is required by amended claim 78. Thus, claim 78, as amended is not anticipated by Alft, and the § 102(b) rejection of this claim must be withdrawn.

Claim Rejections 35 U.S.C. § 103

The Examiner rejected claims 25 and 57-72 as unpatentable under 35 U.S.C. § 103(a) over Alft. Claim 25 has been amended to more particularly define the invention. Certain of dependent claims 57-71 have been amended to correct dependencies and provide antecedent basis. Claim 72 has been cancelled.

Independent claim 25, as amended, is directed to a horizontal drilling system comprising a horizontal drilling machine having a plurality of automated functions and a machine control system. The machine control system comprises a plurality of sensors and a main control circuit. At least one of the plurality of automated functions is selected from the group comprising a pipe handling function, a guidance control function, and a tracking function. Further, claim 25, as amended, specifically identifies sensors included in the plurality of sensors, when the automated function selected comprises the guidance control function or the tracking function.

Alft discloses a horizontal drilling system having a drilling machine, drill string, a drive system, a plurality of sensors, and a central processor. Alft indicates that the processor may operate parts of the drilling system. Nowhere, however, does Alft describe or suggest the particular sensors that are required to automatically operate the drilling machine when a guidance control or tracking function is operated, as is claimed in Applicants' claim 24. Furthermore, there is no description or suggestion of the properties of the machine operation that the sensors detect. Alft does not disclose, for example, that when the guidance control function of the machine is automatically operated, a thrust circuit output sensor, a rotation circuit output sensor, and a carriage position sensor are part of the system, as claimed in Applicants' claim 25. Nor does Alft suggest that sensors are needed to monitor the thrust applied to the drill string, the rotation applied to the drill string, or the position of the carriage, so that the guidance control of the machine can be automatically controlled, as Applicants' claim 25 requires. Alft is devoid of any discussion or suggestion of the particular sensors needed and machine properties sensed in order to automatically operate the particular functions of the drilling machine.

In the § 103 rejection of claim 25, the Examiner has recognized that "Alft does not specifically recite individual sensors for each automated function" (*see* Office action, page 8-9), but failed to identify any other reference or how one of ordinary skill in the art would know to identify the particular sensors as identified in Applicants' claim 25. The Examiner only made bare statements about general problems and functions recited in the Alft reference. The

Examiner failed to identify any teaching, suggestion, or motivation that would support a showing that one of ordinary skill in the art would have modified the Alft reference to make the claimed invention. Thus, the Examiner has failed to make a prima facie showing of obviousness, and the § 103 rejection of claim 25 must be withdrawn.

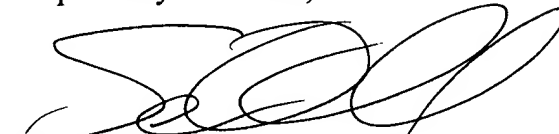
Claims 57-71 are dependent claims, depending directly or indirectly from independent claim 25, and contain all of the limitations thereof. These claims 57-71 further identify sensors needed to automatically operate the horizontal drilling machine, or properties of the main control circuit, that Alft does not disclose or contemplate. As with claim 25, Alft does not teach or suggest the particular sensors needed for automatic operation of the drilling machine, and the Examiner has failed to establish a prima facie case of obviousness with regard to the features of these claims. Applicants note that the Examiner included claim 70 in the general recitation for the § 103 rejection of claims 25 and 57-72, but did not identify any discussion of the features of claim 70 in the text of the rejection. As claims 57-71 depend from claim 25 and include further limitations with respect to Applicants' invention, these claims are also allowable over Alft and the § 103 rejection should be withdrawn.

Applicants note that the Examiner indicated that New Claims 72-78, added in Amendment dated February 24, 2003, and arguments therefore failed to comply with 37 CFR 1.111(b) because Applicants' arguments did not specifically point out how the language of the claims patentably distinguish the claims from the references. Claims 72-74 have been deleted. Claims 75-78 have been amended and distinguished from the cited prior art in discussion above with respect to other rejections in the current Office action. Applicants submit that claims 75-78 are now allowable and the 37 CFR 1.111(b) objection is moot.

Applicants submit that the application, as amended herein, now is in condition for allowance. A Notice of Allowance courteously is solicited. In the event that there are any questions or comments concerning this amendment or the application, the Examiner is invited to contact the undersigned.

This is intended to be a complete response to the Office Action mailed April 11,
2003.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Sean V. O'Connell', written over a horizontal line.

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